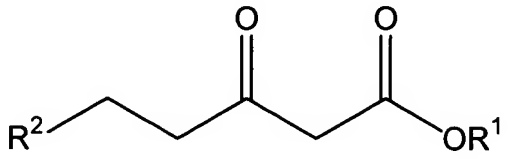
WHAT IS CLAIMED IS:

1. A method of making a compound comprising reacting a compound of formula (II),



(II)

wherein

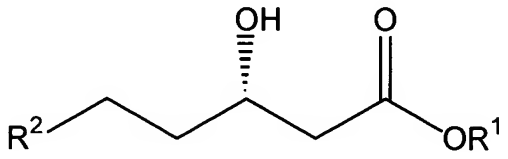
R^1 is independently alkyl, alkenyl, alkynyl, cycloalkyl, arylalkyl, or heteroarylalkyl;

R^2 is independently alkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, each optionally substituted with 1 to 4 independent NR^6R^6, $C(O)NR^6R^6$, OR^6, SR^6, $C(O)OR^6$, $C(O)R^6$, $S(O)_nR^6$, NO_2, CN, halo, $NR^6C(O)R^6$, or $NR^6S(O)_nR^6$;

Each R^6 is independently alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heterocyclyl, arylalkyl, or heteroarylalkyl, each optionally substituted with 1-4 independent substituents selected from the group hydroxy, mercapto, amino, alkoxy, carboxylic acid, ester, amido, N-alkyl-substituted amido, halo, nitro, and nitrile; and

n is 1 or 2;

with a chiral borane reducing agent to give a compound of formula (I):

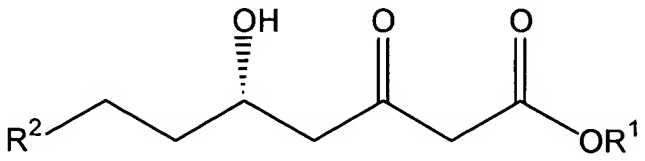


(I)

wherein R^1 and R^2 are as defined above.

2. The method of claim 1, wherein the reacting is performed at room temperature.

3. The method of claim 1, further comprising converting a compound of formula (I) to a compound of formula (III):



(III)

wherein

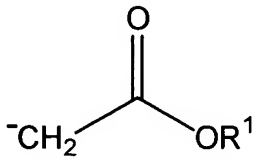
R^1 is independently alkyl, arylalkyl, or heteroarylalkyl;

R^2 is independently alkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, each optionally substituted with 1 to 4 independent NR^6R^6, $C(O)NR^6R^6$, OR^6, SR^6, $C(O)OR^6$, $C(O)R^6$, $S(O)_nR^6$, NO_2, CN, halo, $NR^6C(O)R^6$, or $NR^6S(O)_nR^6$;

Each R^6 is independently alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heterocyclyl, arylalkyl, or heteroarylalkyl, each optionally substituted with 1-4 independent substituents selected from the group hydroxy, mercapto, amino, alkoxy, carboxylic acid, ester, amido, N-alkyl-substituted amido, halo, nitro, and nitrile; and

n is 1 or 2.

4. The method of claim 3, wherein the compound of formula (I) is reacted with a nucleophile, or salt thereof, of formula (IV):



(IV)

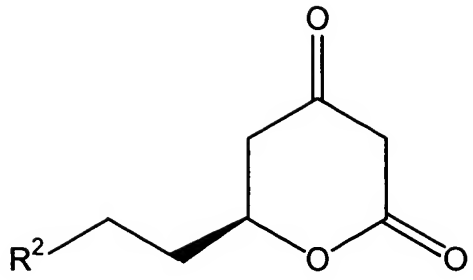
wherein

R^1 is independently alkyl, arylalkyl, or heteroarylalkyl;

to give the compound of formula (III).

5. The method of claim 4, wherein the nucleophile is the lithium salt of the t-butylacetate anion.

6. The method of claim 1, further comprising converting a compound of formula (I) to a compound of formula (V):



(V)

wherein

R^2 is independently alkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, each optionally substituted with 1 to 4 independent NR^6R^6, $C(O)NR^6R^6$, OR^6, SR^6, $C(O)OR^6$, $C(O)R^6$, $S(O)_nR^6$, NO_2, CN, halo, $NR^6C(O)R^6$, or $NR^6S(O)_nR^6$;

Each R^6 is independently alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heterocyclyl, arylalkyl, or heteroarylalkyl, each optionally substituted with 1-4 independent substituents selected from the group hydroxy, mercapto, amino, alkoxy, carboxylic acid, ester, amido, N-alkyl-substituted amido, halo, nitro, and nitrile; and

n is 1 or 2.

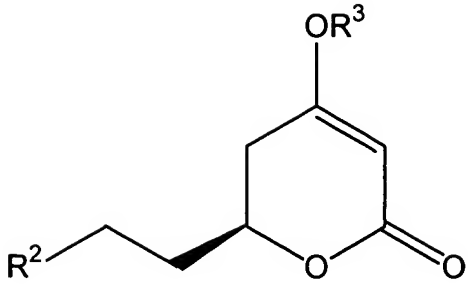
7. The method of claim 6, wherein the converting includes reacting with an acid catalyst.

8. The method of claim 7, wherein the acid catalyst is an organic acid.

9. The method of claim 7, wherein the acid is an acetic acid or a sulfonic acid.

10. The method of claim 7, wherein the acid catalyst is trifluoroacetic acid, p-toluenesulfonic acid, or camphorsulfonic acid.

11. The method of claim 1, further comprising converting a compound of formula (I) to a compound of formula (VI):



(VI)

wherein

R^2 is independently alkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, each optionally substituted with 1 to 4 independent NR^6R^6, $C(O)NR^6R^6$, OR^6, SR^6, $C(O)OR^6$, $C(O)R^6$, $S(O)nR^6$, NO_2, CN, halo, $NR^6C(O)R^6$, or $NR^6S(O)_nR^6$;

n is 1 or 2;

R^3 is independently H, alkyl, arylalkyl, heteroarylalkyl, each optionally substituted with 1 to 4 independent NR^6R^6, $C(O)NR^6R^6$, OR^6, SR^6, $C(O)OR^6$, $C(O)R^6$, $S(O)_nR^6$, NO_2, CN, halo, $NR^6C(O)R^6$, or $NR^6S(O)_nR^6$; and

Each R^6 is independently alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heterocyclyl, arylalkyl, or heteroarylalkyl, each optionally substituted with 1-4 independent substituents selected from the group hydroxy, mercapto, amino, alkoxy, carboxylic acid, ester, amido, N-alkyl-substituted amido, halo, nitro, and nitrile.

12. The method of claim 11, wherein the converting includes reacting with an alkylating agent in the presence of a base.

13. The method of claim 12, wherein the alkylating agent is an alkyl halide.

14. The method of claim 12, wherein the alkylating agent is an alkyl sulfate.

15. The method of claim 1, wherein the chiral borane reducing agent is a borane-dimethylsulfide complex.

16. The method of claim 1, wherein the chiral borane reducing agent is a borane-dimethylsulfide complex derived from a chiral 2-pyrrolidinemethanol derivative.

17. The method of claim 1, wherein the chiral borane reducing agent is an oxazapyrrolidinyl borane.

18. The method of claim 1, wherein the chiral borane reducing agent is a borane-dimethylsulfide complex derived from (S)-(-)-α,α,-diphenyl-2-pyrrolidinemethanol.

19. The method of claim 1, wherein the chiral borane is derived from (S)-(-)-α,α,-diaryl-2-pyrrolidinemethanol.

20. The method of claim 1, wherein the chiral borane is derived from (S)-(-)-α,α,-dialkyl-2-pyrrolidinemethanol.

21. The method of claim 1, wherein the compound is a kavalactone.

22. The method of claim 1, wherein the compound is a compound present in the extract of kava kava.

23. A method of making a kavalactone comprising the method of claim 1.

24. A method of making a kavalactone comprising the method of claim 3.

25. A method of making a kavalactone comprising the method of claim 6.

26. A method of making a kavalactone comprising the method of claim 11.

27. A method of making an enantio-enriched kavalactone comprising the method of claim 1.

28. The method of claim 1, wherein the kavalactone is dihydrokawain.

29. The method of claim 1, wherein the kavalactone is (S)-(+)-dihydrokawain.

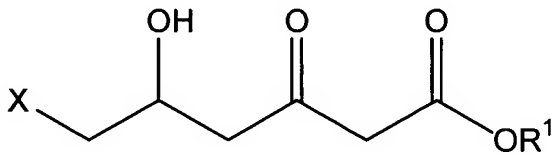
30. The method of claim 1, wherein the kavalactone is dihydrokawain or dihydromethysticin.

31. The method of claim 1, wherein the compound is a kavalactone derivative compound.

32. The method of claim 1, wherein the compound is a dihydrokawain derivative compound.

33. The method of claim 1, wherein the compound is an active kavalactone derivative compound.

34. A method of making a compound comprising reacting a compound of formula (VIII):



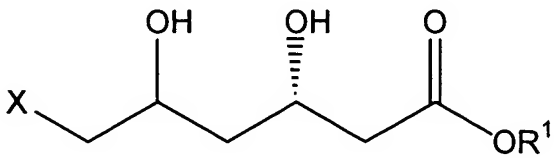
(VIII)

wherein

R^1 is independently alkyl, arylalkyl, or heteroarylalkyl;

X is a leaving group;

with a chiral borane reducing agent to give a compound of formula (VII)

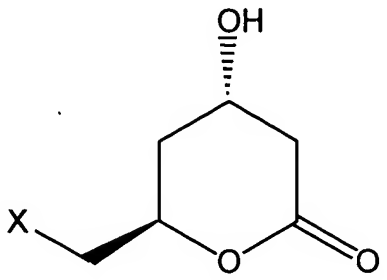


(VII)

wherein R^1 and X are as defined above.

35. The method of claim 34, wherein the reacting is performed at room temperature.

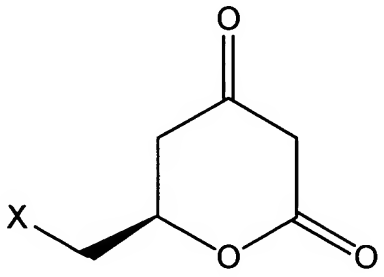
36. The method of claim 34, further comprising converting a compound of formula (VII) to a compound of formula (IX):



(IX)

wherein X is a leaving group.

37. The method of claim 34, further comprising converting a compound of formula (VII) to a compound of formula (X):



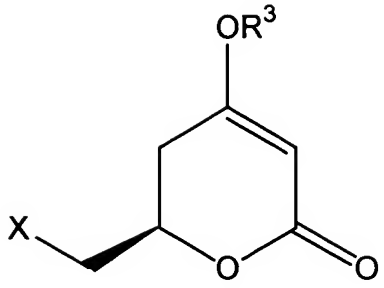
(X)

wherein

X is a leaving group.

38. The method of claim 37, wherein the converting includes reacting with an oxidizing agent.

39. The method of claim 34, further comprising converting the compound of formula (VII) to a compound of formula (XI):



(XI)

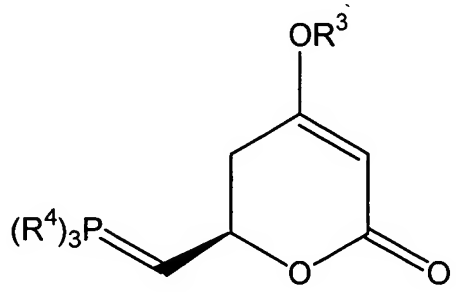
wherein

R^3 is independently H, alkyl, arylalkyl, heteroarylalkyl; and

X is a leaving group.

40. The method of claim 39, wherein the converting includes reacting with an alkylating agent in the presence of a base.

41. The method of claim 34, further comprising converting the compound of formula (VII) to a compound of formula (XII):



(XII)

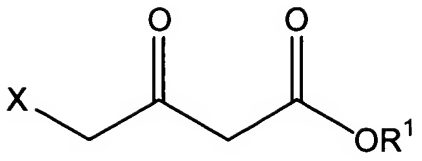
wherein

R^3 is independently H, alkyl, arylalkyl, heteroarylalkyl; and

each R^4 is independently alkyl or aryl.

42. The method of claim 41, wherein the converting includes reacting with a triaryl-substituted phosphine.

43. A method of making a compound comprising reacting a compound of formula (XIV):



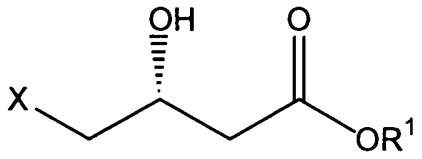
(XIV)

wherein

R^1 is independently alkyl, arylalkyl, or heteroarylalkyl; and

X is a leaving group;

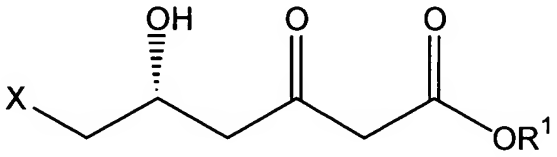
with a chiral borane reducing agent to give a compound of formula (XIII).



(XIII)

wherein R^1 and X are as defined above.

44. The method of claim 43, further comprising converting a compound of formula (XIII) to a compound of formula (XV):



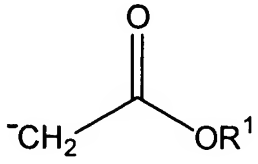
(XV)

wherein

R^1 is independently alkyl, arylalkyl, or heteroarylalkyl; and

X is a leaving group.

45. The method of claim 44, wherein the compound of formula (XIII) is reacted with a nucleophile, or salt thereof, of formula (IV):



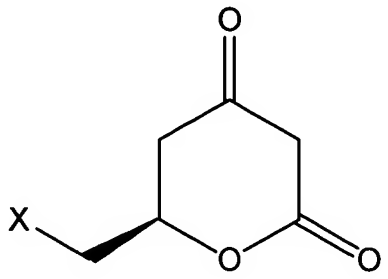
(IV)

wherein

R^1 is independently alkyl, arylalkyl, or heteroarylalkyl;

to give the compound of formula (XV).

46. The method of claim 43, further comprising converting a compound of formula (XIII) to a compound of formula (XVI):



(XVI)

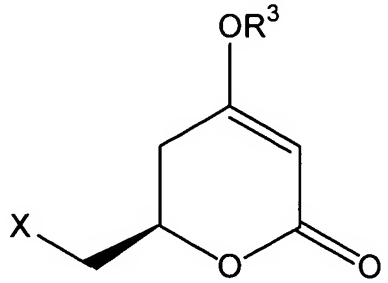
wherein

X is OR^6; and

Each R^6 is independently alkyl, alkenyl, aryl, arylalkyl, or heteroarylalkyl, each optionally substituted with 1-4 independent substituents selected from the group hydroxy, mercapto, amino, alkoxy, carboxylic acid, ester, amido, N-alkyl-substituted amido, halo, nitro, and nitrile.

47. The method of claim 46, wherein the converting includes reacting with an acid catalyst.

48. The method of claim 34, further comprising converting a compound of formula (XIII) to a compound of formula (XVII):



(XVII)

wherein

X is OR^6;

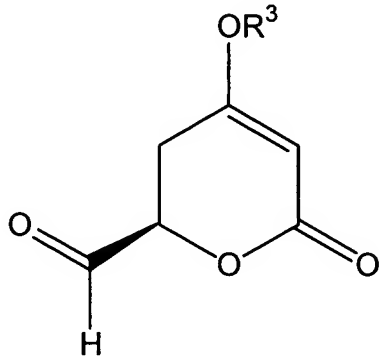
R^3 is independently H, alkyl, arylalkyl, heteroarylalkyl, each optionally substituted with 1 to 4 independent NR^6R^6, $C(O)NR^6R^6$, OR^6, SR^6, $C(O)OR^6$, $C(O)R^6$, $S(O)_nR^6$, NO_2, CN, halo, $NR^6C(O)R^6$, or $NR^6S(O)_nR^6$;

n is 1 or 2; and

Each R^6 is independently alkyl, alkenyl, aryl, arylalkyl, or heteroarylalkyl, each optionally substituted with 1-4 independent substituents selected from the group hydroxy, mercapto, amino, alkoxy, carboxylic acid, ester, amido, N-alkyl-substituted amido, halo, nitro, and nitrile.

49. The method of claim 48, wherein the converting includes reacting with an alkylating agent in the presence of a base.

50. The method of claim 43, further comprising converting a compound of formula (XIII) to a compound of formula (XVIII):



(XVIII)

wherein

R^3 is independently H, alkyl, arylalkyl, heteroarylalkyl, each optionally substituted with 1 to 4 independent NR^6R^6, $C(O)NR^6R^6$, OR^6, SR^6, $C(O)OR^6$, $C(O)R^6$, $S(O)_nR^6$, NO_2, CN, halo, $NR^6C(O)R^6$, or $NR^6S(O)_nR^6$;

n is 1 or 2; and

Each R^6 is independently alkyl, alkenyl, aryl, arylalkyl, or heteroarylalkyl, each optionally substituted with 1-4 independent substituents selected from the group hydroxy,

mercapto, amino, alkoxy, carboxylic acid, ester, amido, N-alkyl-substituted amido, halo, nitro, and nitrile.

51. The method of claim 50, wherein the converting includes reacting with an oxidizing agent.

52. A composition comprising a compound produced according to claim 1.

53. The composition of claim 52, wherein the composition is a nutraceutical food product.

54. The composition of claim 52, wherein the composition is a topical ointment.